

Zero Retries issue 0014 2021-10-15

Advanced Amateur Radio - Data Communications; Space; Microwave... the fun stuff!

Nothing great has ever been accomplished without irrational exuberance. Tom Evslin.

Irrational exuberance is pretty much the business model of Zero Retries. Steve Stroh N8GNJ

The Universal Purpose of Ham Radio is to have fun messing around with radios. Bob Witte K0NR

Steve Stroh N8GNJ, Editor

Jack Stroh, Late Night Assistant Editor

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Bellingham Is Special (To Me)

When my wife Tina and I decided to leave the Seattle area, we had the usual semi-retirees choices of where to live. Our first decision point about where to relocate was out of the Pacific Northwest (or Northwet, as I describe it during the deep damp of the winters). Given that we'd invested 34 years into this region and grown to love it and be comfortable here, we decided to stay in the region. Once that choice was made, we quickly narrowed it down to Bellingham. We'd been coming to Bellingham every April for most of that time, and Bellingham had grown on us as a pleasant community. It seems to be one of those lucky few places that once people encounter it, it sticks with them until, like us, they have a choice of places to go, and they remember how much they enjoyed being here and decide to come back.

Located in the far Northern and Northwest corner of Washington, [Bellingham Washington](#) is, in my opinion, a remarkable community. It is a college town ([Western Washington University](#)), but "Western" and its 16,000 students don't dominate Bellingham or its economy like colleges sometimes do (other than dominating the rental housing market). 30 miles east of Bellingham, rising 10,781 feet, is the major recreational attraction of Mount Baker and the Mount Baker National Forest. Another point of pride for Bellingham that contributes to its livability and tourism is that it's the Southern terminus for the [Alaska Marine Highway System](#) and thus Bellingham gets a lot of Summer tourists going to and from Alaska via the AMHS. Bellingham used to get a *lot* of tourism from nearby Vancouver, BC, but the US / Canada border was closed for most of 2020 and most of 2021. The border is "open" now, but the requirements for tourism crossings into Canada are so draconian that the border is effectively still closed.

Bellingham has a diverse mix of industries, including [Bellingham Cold Storage](#) (seafood from Alaska), [All American Marine](#) builds substantial boats, [Grizzly Industrial](#) makes rugged shop tools and power tools. Bellingham has an interesting mix of technology industry including [Alpha Technologies](#) which make power systems (including the ubiquitous gray boxes on power poles that keep cable systems powered during power outages), a [T-Mobile call center](#), [Emergency Reporting](#) which makes software and systems for first responder call centers, and [Blue Sea Systems](#) which sells products for small boat electrical systems. Bellingham is also the headquarters of [SPIE - the International Society for Phototonics and Optics](#).

Bellingham offers a nice mix of rural and city living. There are a number of independent theaters, a number of excellent bookstores and just generally plenty of interesting people and organizations. Some tech-related organizations in Bellingham that make life more interesting to me include [Bellingham Technical College](#), [Whatcom Community College](#) (surprising amount of tech), [Spark Museum of Electrical Invention](#), [Technology Alliance Group for Northwest Washington \(TAGNW\)](#), [Mount Baker Amateur Radio Club](#) and [Whatcom Emergency Communications Group](#) for Amateur Radio, and [Bellingham Linux User Group](#), which sponsored the very popular [LinuxFest Northwest](#) every April... pre-COVID-19. (Before Linux, there was a [Bellingham OS-9 User Group](#).)



Photo courtesy of Bellingham Makerspace

Included with the above organizations that make life in Bellingham more interesting to me is the [Bellingham Makerspace](#) (formerly The Foundry). If you aren't familiar with makerspaces in general, think big, messy, noisy power tools and other specialized equipment such as electronics assembly and test equipment, sewing, 3D printing, laser cutting, vinyl cutting, poster printing, even fabric screen printing, etc. all in a shared space. But mostly... makerspaces are about community. Makerspaces don't emphasize that aspect nearly enough, to their detriment. They talk about the tools, but they don't talk enough about the people. Techies (like me) tend towards introversion, and a makerspace is a great place for techie introverts to feel part of a community because you're working in a shared space, and often working on shared projects. What really makes a makerspace work is for curious people to find them and every hour spent in a makerspace is a learning experience because you're surrounded by other people with interesting skills. Bellingham Makerspace has gone through some turmoil in its short life (not unusual for mostly volunteer organizations, especially those with physical property), and their current location at the Bellis Fair Mall in Bellingham is its third location. Despite 2021's many challenges, Bellingham Makerspace is stabilizing and beginning to grow its community.

Post-publication update: As of 2021-12-15, my wife Tina KD7WSF and I are no longer associated with the Bellingham Makerspace and the Bellingham Makerspace Amateur Radio Group (and the Bellingham Maker Faire, at least while it's sponsored by the Bellingham Makerspace). Thus ends my experiment to try to create a different kind of Amateur Radio organization at a Makerspace. It might be possible to pivot my ideas for a "new paradigm Amateur Radio Group" to a different community in the Bellingham area - to be determined.

Bellingham Maker Faire 2021



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Bellingham

Maker Fa

Presented by

**BELLINGHAM
MAKERS**



**Saturday Oct
10AM -**

at Bellingham M
next to Dick's Sp

**Make
Craft
Wood**

**Tinkering
Electronics
Robots**

R



Bellingham Maker Faire sign in Bellis Fair Mall (one of 3 that mall management permitted within the mall) Photo by Steve Stroh N8GNJ

All of the above is prelude to a brand new “Bellingham Is Special” organization - the first annual [Bellingham Maker Faire](#) which was held on Saturday, October 9, next door to the Bellingham Makerspace in the Bellis Fair Mall. The Maker Faire was a “pop-up” event, sponsored by the Bellingham Makerspace, in a vacant store in the mall, conveniently next door to the Bellingham Makerspace. As part of the Maker Faire, the Makerspace gave tours of its facilities and we impressed a lot of people. I spent most of my time there during the seven hours of the Maker Faire in the new Amateur Radio area of the Bellingham Makerspace, but I did make it over to the Maker Faire and two exhibits really wowed me. The first was Baker Creek Ceramic Studio demonstrated a 3D printer that printed a [thin ribbon of clay - it was printing a ceramic pot](#)! That hammered home to me that if you can extrude it, you can 3D print it.

The second was a [amazingly cool device](#) shown by [TAGNW](#) that was a handheld device that combined machine learning, camera pattern recognition, and speech synthesis all in a handheld package that you pointed at an object, the system figured out what it was, and it announced it. It was completely self-contained - there was no wireless communication to back-end cloud server. The hardware was a [Raspberry Pi 4](#) with [Adafruit Brainscraft HAT](#) and a [Raspberry Pi High Quality camera](#). The software included [TensorFlow Lite](#). Tying it all together was a 3D printed case for the unit and another [3D printed case for the camera](#). This wasn’t a product, it was an open source project. Imagine how useful that would be to a blind person living alone. Is the bottle you’re picking up hand sanitizer, or shampoo? This device could tell you.

Bellingham Maker Faire 2021 created a lot of interest and energy. Those tasked with trying to count attendees gave up counting at approximately 350 people just circulating through the Makerspace, not counting the hundreds of others that probably just visited the Maker Faire next door to the Makerspace. There will definitely be a Bellingham Maker Faire 2022 - the planning has already started.

Observations about the Bellingham Maker Faire

I wasn’t on the committee that organized the Bellingham Maker Faire, but preparations seemed pretty basic:

- Secure a Maker Faire [license](#). A generous donor within the Bellingham Makerspace community paid the license fee for the Bellingham Maker Faire.
- Find a venue. If Bellis Fair Mall is indicative, an indoor shopping mall is an excellent place to hold a small Maker Faire because it will have vacant stores that can be rented for a pop-up event like a Maker Faire. Bellis Fair Mall was very cooperative for the Bellingham Maker Faire but they also had an existing relationship with Bellingham Makerspace, but they were happy for the additional traffic through the Mall on a Saturday.
- Insure that the sponsoring group can get insurance coverage, usually just an insurance rider.
- Publicize, *publicize*, **publicize**!
- Have an online method to accept signups and payment for space. You’ll need to have a planning czar that will “own” the decisions on where to put people.
- It looked to me like all the participants at the Bellingham Maker Faire required AC power, and that requires planning with ample good quality extension cords and power distribution like good power strips, anti-trip conduits, and lots and lots of gaffer tape - not duct tape! Gaffer tape does not leave residue on when peeled up off carpets - duct tape does leave residue.
- There are lots of people needed on the day of the Makerspace - traffic control loading in and loading out, extra hands to move exhibitors in and out quickly, helping direct folks, etc.
- Volunteers should be easy to differentiate - custom T-shirts are one good way, but hats would probably work also.
- The manager of the event should be easily located when needed. Ours wore a bright yellow safety vest and was thus easy to spot.

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Bellingham Maker Faire - Takeaways for Amateur Radio



Bellingham Makerspace Amateur Radio Area Photo by Steve Stroh N8GNJ

Since last week's discussion of preparations of the Amateur Radio area, the Bellingham Makerspace Board of Directors authorized the formal incorporation of Amateur Radio activities into the Bellingham Makerspace by creating the Bellingham Makerspace Amateur Radio Group. That was a very welcome development!

I spent all but a few minutes staffing the new Amateur Radio area of the Bellingham Makerspace as seen above. I talked to perhaps two dozen interested people. I offered my handouts to them and perhaps half of those I talked to took one. My main thrust was to emphasize the more modern and data-centric aspects of Amateur Radio. The display of APRS stations (middle display) seemed to be of most interest.

Truth be told, the Amateur Radio star of the Bellingham Maker Faire was Gayland Gump KG7GCF who was the only Amateur Radio operator to volunteer to help me represent Amateur Radio at the Bellingham Maker Faire. KG7GCF volunteered to do a soldering demonstration of building a [Nexus DR-X](#). KG7GCF has a comfortable manner and kids were really interested as tours of the Makerspace passed by the bench he was working at. KG7GCF also brought his well-made Go Kit and both of us used it as a visual reference. Unfortunately, as we suspected, the RF noise level within the mall, and especially within the Makerspace was very high. One issue is that there are at least six 3D printers within a few feet of the Amateur Radio area - those certainly help raise the din.

It's obvious to me that there are many potential synergies between makerspaces, Maker Faires, and Amateur Radio and local Amateur Radio Operators. Those synergies aren't readily apparent to those who are not currently Amateur Radio Operators, so it falls to the Amateur Radio Operators to try to explain those synergies, couched in terms non-Amateurs can understand such as teaching classes about basics of radio technology that are the foundation for mobile phones, Wi-Fi, and all other aspects of radio-based communications.

Observations about presenting Amateur Radio at the Bellingham Maker Faire:

- It quickly became obvious that a large screen television is needed to display a slide show with interesting graphics to catch the attention of those touring through the Makerspace. We've procured reasonably large HD televisions for under \$100 each by watching local for sale info. Hardly anyone wants old "HD" resolution televisions when 4K televisions are so reasonably priced.
- Soldering demonstrations work and get attention. - definitely do those, not just to demonstrate the usability of the electronics area (small kits for kids, like a simple LED flasher?) and Amateur Radio projects to emphasize the hands-on nature of Amateur Radio.
- Another hands-on project might be building antennas out of common materials like PVC and wire. I'm a fan of the [TBJ-1 144 / 222 / 440 antenna](#) (PDF) designed by Ed Fong WB6IQN who allows his patent-pending design to be built by clubs and individuals for non-commercial use.
- There was far more "crowd density"... probably 5x... in the Maker Faire area as opposed to the Makerspace, so perhaps there should have been a satellite Amateur Radio table in the Maker Faire area to serve to direct folks with real interest over to the Makerspace Amateur Radio Area.

Overall, the Amateur Radio presentation went reasonably well and met my modest objectives for a first effort on a short timeline with nearly no resources and next to no help. Other than an event specific to Amateur Radio, such as a hamfest or field day, this is about as good an exposure to Amateur Radio as could be hoped for. As mentioned above, planning has already begun for Bellingham Maker Faire 2022 and Bellingham Makerspace Amateur Radio Group will be one of the many exhibitors.

ZR > BEACON

- [KrakenSDR](#) is a five-channel, RX-only, software-defined radio (SDR) based on the RTL-SDR and designed for phase-coherent applications and experiments. Phase-coherent SDR opens the door to some very interesting applications, including radio direction finding, passive radar, and beam forming. You can also use KrakenSDR as five separate radios.

KrakenSDR is an upgraded version of our previous product, KerberosSDR. It provides a fifth receive channel, automatic phase-coherence synchronization capabilities, bias tees, a new RF design with cleaner spectrum, USB Type-C connectors, a heavy-duty enclosure, upgraded open source DAQ and DSP software, and an upgraded Android app for direction finding. We are constantly working on new software and sample applications, so keep an eye out for future updates!

Within a day, KrakenSDR exceeded its \$100,000 funding goal. One configuration of the KrakenSDR is \$299.

- The "QDX" ([QRPLabs Digital Xcvr](#)): a feature-packed, high performance, four-band (80, 40, 30, 20m) 5W Digi-modes transceiver kit, including embedded SDR receiver, 24-bit 48 kbps USB sound card, CAT control, synthesized VFO with TCXO reference. QDX transmits a SINGLE SIGNAL, it is not an SSB modulator with associated unwanted sideband and residual carrier, or intermodulation due to amplifier non-linearity. QDX outputs a pure single signal.

The QDX initial production run also sold out within a day. It looks interesting! With the enclosure, the cost for the kit is a modest \$80.

Closing The Channel

As of 2021-09-13, Zero Retries is now on Twitter - [@zeroretires](#). I'm not yet *very* active there, but I'll try to pay attention.

A commenter in Reddit pointed out that I should disclaim that the views I express in about Amateur Radio in Zero Retries are mostly about Amateur Radio in the US. That comment is correct, thus consider it disclaimed that Zero Retries has a US-centric perspective of Amateur Radio. I do my best to think of "rest of world" Amateur Radio in my writing, but I'm not there in other parts of the world, so if I say something blatantly inaccurate, please call me out.

If you're enjoying Zero Retries, please tell your friends and co-conspirators. For the immediate future, Zero Retries will remain an experiment in progress. Feedback is easy if you're reading Zero Retries in email - just hit Reply and I'll get your email. Or you can go to the web version of any Zero Retries issue, scroll to the bottom, and post a comment on the web version of a Zero Retries issue. I'm especially interested in content ideas about things that you'd like to see discussed in Zero Retries. If you know of "Zero Retries Interesting" projects, groups, activities, etc. please let me know. I do reply to every Zero Retries email I receive.

Email issues of Zero Retries are "instrumented" by [Substack](#) to gather basic statistics about opens, clicking links, etc. There is no "text only, no instrumentation" version of Zero Retries available. I don't use such information in any way other than (in the absence of much feedback) getting some satisfaction that the data shows that people actually do read Zero Retries.

All previous issues of Zero Retries are available without restriction (no paywalls). For some background on Zero Retries, Issue 0000 was The Introduction Issue.

Thanks for reading!
Steve Stroh N8GNJ

Bellingham, Washington, USA

2021-10-15

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Below is a much more complete "footer" that has evolved over 30+ issues of ZR.

Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, here are some pointers:

- **Ham Radio for Dummies** by Ward Silver N0AX is a great overview of Amateur Radio. N0AX is a gifted writer and HRFD is now in its [4th edition](#).
- My two favorite **YouTube** channels for a good overview of Amateur Radio are [AmateurLogic.TV](#) and [Ham Nation](#) (part of Ham Radio Crash Course). These folks just seem to have so much fun!
- [Radio Amateur Training Planning and Activities Committee \(RATPAC\)](#) offers weekly presentations on general Amateur Radio topics (Wednesdays) and emergency communications in Amateur Radio (Thursdays).
- Dan Romanchik KB6NU offers a free **No-Nonsense Study Guide** for the [Technician test](#) (PDF).
- [HamExam.org Amateur Radio Practice Exams](#) offers good **Flash Card and Practice Exams**.
- When you're ready to take an **Amateur Radio examination** (Tech, General, or Extra), W1MX - The MIT Amateur Radio Society offers [remote exams](#), free for students and youngsters. *There are apparently [many other remote exam options](#).*

Bonus - with an Amateur Radio license, you'll be [more attractive on dates](#) 😊

Closing the Channel

- In its mission to grow Amateur Radio and make it more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex!
- My ongoing Thanks to Tina Stroh KD7WSF for, well, *everything* and Bill Vodall W7NWP as *Zero Retries Instigator in Chief*.
- My ongoing Thanks to pseudostaffers [Dan Romanchik KB6NU](#) and [Jeff Davis KE9V](#) for continuing to spot, and write about "Zero Retries Interesting" type items, on their respective blogs, from Amateur Radio and beyond, that I don't spot on my own.
- [Southgate Amateur Radio News](#) consistently surfaces "Zero Retries Interesting" stories.
- The [Substack email publishing platform](#) makes Zero Retries possible. I recommend it for publishing newsletters.

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More bits from Steve Stroh N8GNJ:

- [SuperPacket blog](#) - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*

- [N8GNJ blog](#) - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!

Steve Stroh N8GNJ (He / Him)

These bits were handcrafted in beautiful Bellingham, Washington, USA

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